DOCUMENT RESUME

ED 070 210 EC 050 203

AUTHOR	McKeen, Cliff; And Others
TITLE	Peer Interaction Rate, Classroom Activity and Teaching Style.
INSTITUTION	Oregon Univ., Eugene. Center at Oregon for Research in the Behavioral Education of the Handicapped.
SPONS AGENCY	Bureau of Education for the Handicapped (DHEW/OE), Washington, D.C.
REPORT NO	CORBEH-10
BUREAU NO	BR-7-0706
PUB DATE	Jul 72
NOTE	27p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Behavior Patterns; *Class Activities; Classroom Environment; Group Behavior; *Interaction Process Analysis; Peer Relationship; Research Projects; *Student Behavior; *Teaching Methods

ABSTRACT

Relationships among peer social interaction rate, classroom activity, and teaching style were investigated to determine whether teaching style could be defined in terms of differential student interaction rates across various classroom activities. Peer interaction rates were determined in three primary level classrooms representing various teaching styles: classroom I was termed democratic (group process, self-directed learning), classroom II was authoritarian (direct instruction, frequent monitoring of behavior), and III was laissez-faire. Peer interaction rate per minute, per child was computed during six types of class activity in each classroom: teacher led activity, aide led activity, student led activity, leaderless group work, independent seat work, and transition periods. Results showed a consistent increase in peer interaction rate between teacher led and seat activity and between seatwork and transition periods in all classrooms (mean rates .19, .46, .97 respectively). Average peer interactions per 10 minutes were: five in I, two to three in II, four in III. II showed high rates during transition. Other data on interaction rate types of activities conducted were also found to reflect the three different teaching styles. (KW)

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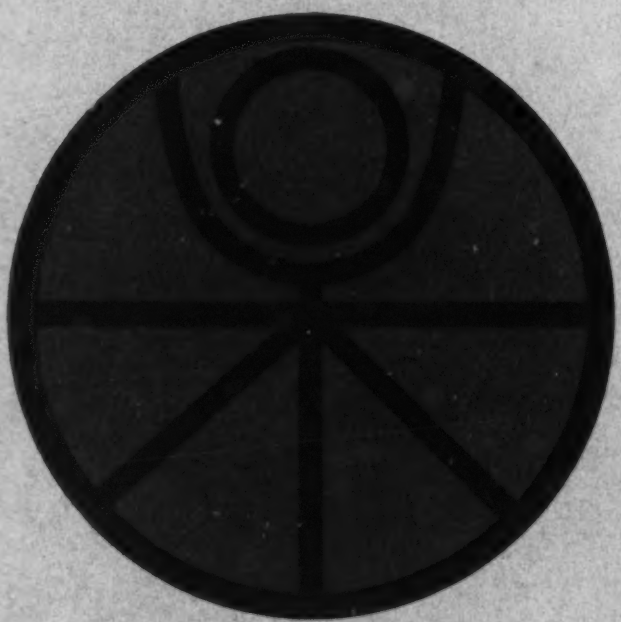
Cliff McKeen, Hyman Hops and Hill M. Walker



Center at Oregon for Research in the Behavioral Education of the Handicapped, Department of Special Education, Clinical Services Building, University of Oregon, Eugene, Oregon 97403

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Center at Oregon for Research in the
Behavioral Education of the Handicapped
203 Clinical Services Building
Department of Special Education
University of Oregon
Eugene, Oregon 97403

The research or work report herein was performed pursuant to a contract with the Office of Education, U. S. Department of Health, Education, and Welfare through the Center at Oregon for Research in the Behavioral Education of the Handicapped, an R & D Center funded by the Division of Research, Bureau of the Handicapped.

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PEER INTERACTION RATE, CLASSROOM ACTIVITY, AND TEACHING STYLE

Cliff McKeen, Hyman Hops, and Hill M. Walker

The process of social interaction is of fundamental importance in child development. Through social interaction, children practice social skills, try varieties of social roles, and assimilate cultural norms of social behavior. Hartup (1970) suggests that whereas child-adult social interaction is of dominant importance, at least through early childhood, peer interaction rapidly assumes comparable influence. Research on these participant components of social interaction has mainly attempted to identify or develop specific aspects of social behavior, or to specify contingency relationships between different approach behaviors and subsequent responding (Olpin & Kogan, 1969; Wiesen, Hartley, Richardson, & Roski, 1967).

Research methodology in the area of social interaction has traditionally concentrated on observer judgments regarding the content of social interactions, sequential process, or both. Research attention has rarely been given to simply investigating the frequency of social interaction in natural settings, or to tracking developmental changes in social interaction frequency (exceptions include Raph, Thomas, Chess, & Korn, 1968; Fahl, 1970; Barnes, 1971). In addition, whenever a child is described as "acting out," or "socially withdrawn," there is an implied deviation from a setting norm but this norm is seldom specified (Walker & Hops, 1972). Parameters of peer social interaction frequency in this context generally remain to be investigation.

Parallel to interest in developmental aspects of social interaction is an evaluation interest in the influence of peer interaction upon school learning. Evaluation studies of classroom learning outcomes are currently investigating the triangular interface of teacher, student, and instructional materials. Although the teacher variable has typically been considered a uniform, or at least randomized part of curriculum effect, more emphasis is now being given to considering the teacher variable separately (Rosenshine, 1970; Beller, 1971).

Components of the teacher variable that have been investigated include teacher personality traits, descriptive characteristics such as age, sex, and years of experience, and leadership role or teaching style.[1] Usually, teaching style has been defined by descriptive or philosophical characterizations of teacher behavior, e.g., reflective . . . teaching style (Hunt & Joyce, 1967); democratic teaching style (Lewin, Lippitt & White, 1939). A vast number of observations systems have evolved from this approach (Flanders, 1970). However, highly tailored observation systems have made general inferences difficult across independent investigations.

A possible alternative is to define teaching strategy or teaching style in terms of outcome or effect upon student behavior. For example, teaching styles defined in terms of differential student interaction rates across various classroom activities could be empirically related to differences in student learning outcomes as measured by achievement indices. An effect based or outcome referenced definition seems to provide a logically tighter frame of reference for investigating such parameters. In addition, it provides specificity about the denotative meaning of teaching style and thus avoids connotative meanings.

The present study offers an outcome or effect-based method of classifying teaching style. A method for observing group social interaction in natural settings is described; data is presented from its use within regular classroom settings; and potential research applications are outlined.

Method

Subjects

Subjects for the study were urban elementary school students enrolled in three primary level classrooms. The overall number of students comprising the subject pool varied from day to day because of absences, extra classroom activities, etc. There was considerable variation in the size of the groups observed as well. The range for classroom 1 was 7 to 25 students; classroom 2, 7 to 13; and classroom 3, 4 to 16. Smaller group sizes occurred when more than one group was functioning at the same time, e.g., when some children were in a reading group and others were engaged in independent seat work. Parallel observation of two groups proved feasible.

Settings

The classrooms were selected because each contained one child who had been participating in an associated research study (Walker & Hops, 1972). Consequently, they were not randomly selected but chosen for reasons tangential to classroom interaction rate and teaching styles.

The classrooms were diverse as learning environs and differences in teaching style were noticeable. In classroom 1, the teacher emphasized

group process and the concepts associated with self-directed learning. This room corresponded most closely to a "democratic" type of adult leadership classification (Lewin, et al., 1939). The teacher of classroom 2 relied extensively upon direct instruction by herself or her aide to accomplish her objectives. Frequent monitoring of student behavior and emphasis upon task accomplishment were evident. The adult leadership of this classroom corresponded most closely to the "authoritarian" style of the Lewin classifications. The third classroom could be described as "laissez-faire." In this room, a wide range of materials were available, and aside from direct reading instruction or similar directed activities, the children were allowed to pursue their interests at their own pace.

Observation Model

The observational method used in this study evolved from a definition of social interaction as the exchange of signals between two or more students. The definition emphasizes reciprocity as a necessary condition of communication and implies a transitive sender-receiver relationship. That is, the back and forth characteristic of social interactions provided the behavioral base for the observation system. Boundaries of the definition were inclusive in that both verbal and nonverbal messages counted as interaction; but exclusive in that only peer interaction was tallied. The system yields social interaction rate per minute, per child in the classroom; creates little distraction to ongoing classroom activities; and employs simple recording equipment consisting only of a clipboard and writing materials. The resulting average rate may be compared with rates of individual children in the same classroom, with average rates of other

classrooms, or with rates under differing stimulus conditions within the same classroom.

Because any pair of children are potential interactors at any given time, and because of the extensive area to be observed in the typical classroom, it is unlikely that a single observer will be accurate in the absolute sense. However, by using systematic scanning patterns, the probabilities for observing an interaction between any given pair of potential interactors at any given time or room location is roughly equivalent. In essence, the model uses a sampling technique for estimating interaction rate. The sampling is high density and error of observational measurement is probably low, although this point has not yet been empirically determined.

Even casual observation in a regular classroom suggests that peer interaction is in some way related to the ongoing activity. Consequently, to acknowledge and account for variation among classroom activities, a classification system was developed according to the following rationale.

Of the multiple dimensions used for describing classroom stimulus conditions, two seem to have relatively wide generalizability. These are the source of leadership and whether the activity is an individual or group endeavor. Table 1 schematically illustrates these dimensions with classroom

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Insert Table 1 About Here

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activities exemplifying the cell contents. Moving from left to right in Table 1, the degree of control from the teacher's perspective becomes more diffuse and it might be anticipated that peer social interaction rate would increase as external control decreases.

Observation Procedure

The system was developed from a specific research need for an average interaction rate per child per minute with which to contrast equivalent interaction data derived from the behavior of a single child. Social behavior or social interaction rate was operationally defined by an observation format that classified classroom activity into one of six types and counted the interactions occurring within each type of activity. The time interval for each category of observed activity was recorded. Tallies per minute of activity were divided by half the group size (since interaction was defined as requiring two interactors) to yield an average rate for each class member. A manual of procedural details is available upon request from the authors.

Six types of classroom activities were distinguished on the basis of leadership source and number of contributors toward task objective. These were:

1. Teacher led activity. This type of activity is marked by a definite adult leadership. It included all direct instruction, teacher initiated discussion, or other teacher dominated learning situations. However, how or what the teacher does to lead the activity is not of concern.

2. Aide led activity. Because of training, experience, and line of authority differences between teachers and their aides, aide led activities were classified separately. Otherwise the activities included remain the same as those within teacher led activity.

3. Student led activity. This set included classroom activities that are managed by a designated student leader. Examples include class meetings where student officers preside and student committee meetings that have appointment chairman, etc.

4. "Leaderless" group work. This category included classroom activities where interaction between students is permitted or necessary for completion of the assigned task and where there is no appointed student leader.

5. Independent seat work. This classification included individual assignments such as workbooks or other drill tasks that are designed to be completed alone.

6. Transition. This condition denotes the intervals when shifts from one activity to another is occurring.

Not all school activities can be classified under this system. Observation during recess or physical education, for example, would not be feasible using this classification system. However, of the activities that routinely occur with the classroom, a high percentage of them can be systematically included.

Interaction Tally

The interaction tally is a systematic count of the interactions observed during a given activity. Each time an interaction is observed anywhere in the classroom, that event is tallied and the observer continues to scan the room. Scanning is continuous and follows a repetitive pattern to insure that interactions have an approximately equal chance of being observed at any time regardless of geographical location within the classroom. Observation periods ranged from 30 to 50 minutes in the present study.

Reliability

Reliability issues associated with the interaction measurement system are interobserver agreement, both for the frequency of interactions and for the classification of classroom activities. Interaction tally reliability was estimated by having two observers scan the same classroom and record interactions for two, 15-minute sessions. One of the observers was experienced with the present system; the other had considerable experience with individual observation systems. The percent agreement between observers for the two sessions was 82 and 93 percent, respectively. This level of agreement appears adequate for the present research purposes and compares favorably with other interaction rate reliabilities (Crowther & Pantleo, 1970).

To date, data regarding the reliability of classroom activity classification have not been generated. However, experience with the system suggests that categorizing is simple enough to at least match interaction tally agreement.

Results

Stability

Fig. 1 graphically displays the total interaction rate for each of the three classrooms over the course of the study. Each data point represents the interaction rate across all six activities for each observation day during the three-month observation period.

Insert Figure 1 About Here

No consistent accelerating or decelerating trends were noted for any of the three classrooms. The most stable rate of interaction appears in classroom 2. Classroom 1 was also relatively stable with the exception of two more extreme data points. Classroom 3 was the least stable, the rate varying between .22 and .50 per minute on different observation days.

Interaction Rate and Group Size

As mentioned earlier, due to student absenteeism and routine grouping for instructional purposes, observations were obtained from groups that varied considerably in size. Consequently, data were available relating to the question of how group size affects classroom interaction rate. However, it should be mentioned that the design of the present study was not geared to minimize confounding influences with regard to group size.

The data for teacher led activity was selected to examine the relationship between group size and interaction rate. It was the most frequently occurring activity across the three classrooms and is considered to be a universally accepted classroom activity. Fig. 2 displays the interaction rates during teacher led activity as a function of group size. Although

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Insert Figure 2 About Here

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visual inspection suggests a slightly increasing function, a runs test of significance (dichotomized at the median) indicated, at best, a weak relationship between social interaction rate and group size for classrooms 1 and 3 during teacher led activity. (The probability of obtaining these rate sequences by chance were .20 and .11, respectively). The probability of the rate sequence observed in classroom 2 was .70. Thus, there was no significant relationship between group size and social interaction rate across the three classrooms.

Interaction Rate and Activity

Table 2 presents descriptive social interaction rate data for the three classrooms under six activity conditions. However, only three

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Insert Table 2 About Here
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categories of classroom activity: teacher led discussion, seatwork, and transition, contained data for all three classrooms. As shown in Table 2, the overall rates for classrooms 1 and 3 were almost identical to the interaction rates computed on the basis of the three activities alone. Significant differences between the means were found only for classroom 2 ($t = 2.48$, $df = 12$, $p < .05$) in which aide led activity contributed a high rate of interaction to the total. Consequently, further analyses to determine the extent of the differences in interaction rates between specific categories of activity within and between classrooms were computed across the three categories only.

Insert Table 3 About Here

Results of an unweighted-means analysis of variance presented in Table 3 reveal significant effects for types of activities and an interaction effect between classrooms and activities. Fig. 3 graphically presents the means for each of the activities within classrooms. It is clear that a

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Insert Figure 3 About Here
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consistent increase in peer social interaction rate occurs between teacher led and seatwork activites, and again between seatwork and transition periods, for all three classrooms. The mean rates for the three activities

were .19, .46, and .97, respectively. The rates during seatwork more than doubled the rates during the more confining teacher led sessions, and the rates during transition doubling again the seatwork rates.

The significant interaction indicates that the differences between the rates for different activities was partly a function of the specific classroom. The ranges between the interaction rates during teacher led and transition periods (those activities producing the highest and lowest rates) varied from classroom to classroom. For classroom 1 the range was .54, for classroom 2, 1.01, and classroom 3, .81. In addition, there appeared to be a greater difference between seatwork and transition activities in classroom 2 than there was for the other two.

Discussion

A classroom environ may be viewed as a complex of discriminative stimulus conditions that govern or affect student behavior at any given point in time. More specifically, classroom social behavior may be initiated, maintained, or terminated by an array of cues external to the students themselves. Variables which are purported to have such cue potential include size of group, physical layout of the classroom, and teacher behavioral characteristics. However, of the factors influencing classroom social behavior, cues emanating from the teacher are probably most influential. Whether intentional or not, a teacher is continuously structuring learning situations and dispensing reinforcers in ways that appear to systematically influence student social behavior. As such, the teacher exerts powerful control over the social behavior of the class.

Three variables seem apparent as sources of potential teacher influence upon classroom social behavior. First, a teacher must have knowledge of curriculum materials and of the delivery skills necessary to get educational materials to a learner at the appropriate time. Second, the teacher's emphasis on direct teacher instruction as distinguished from peer or self instruction, whether based on habit or educational philosophy, has major importance in determining the level of classroom social behavior that is considered appropriate. The third aspect of teacher based influence on classroom social behavior is the degree to which the teacher differentiates among such activities as the relative importance of teacher versus peer instruction. In other words, do teacher priorities regarding the importance of social behavior vary according to the type of classroom activity?

Reference to Table 2 suggests that differences in teaching style across the three classrooms were reflected in peer interaction rate data and types of activities. Classroom 1 provided students with exposure to more types of work settings than the other two classrooms. Furthermore, this classroom had the smallest mean differences in peer interaction rates between teacher led and transition activities. This finding is congruent with the notion that students in a group-oriented learning experience (classroom 1) should be relatively self sufficient during periods of limited external control. Group process oriented students logically have a history of using cues from themselves and other peers as well as from their teacher. In the event that a particular setting or work condition inactivates or deemphasizes one cue source, it may be that others are still available and are relatively synchronized with each other.

It is apparent that this classroom also tolerated a relatively high peer interaction level. On the average, each child interacted with a peer five times for every 10 minutes of class time in classroom 1.

Classroom 2 data indicate that this was a relatively quiet classroom in which each child, on the average, interacted with peers two to three times for every 10 minutes of classroom activity. Emphasis on individual task accomplishment in this classroom was reflected in the absence of group activities. Rigorous monitoring of student behavior was indicated by the low levels of peer interaction in this classroom relative to the other two classrooms during individual seatwork conditions.

The very high peer interaction rate during the transition activity in this classroom is interesting. Perhaps the direct instruction model, used by this teacher, reinforces reliance upon the teacher as the primary social agent determining interaction level. Transition activity may represent an interval in which the teacher either signals a "breather" or temporarily stops cueing.

Classroom 3 had the second highest overall peer interaction rate of the classes observed. In this classroom, a child, on the average, interacted with a peer four times for every 10 minutes of class time. The children also seemed to discriminate less among different stimulus activities, e.g., transition versus teacher led discussion.

Transition periods in classroom 3 were of a longer duration than those in classrooms 1 and 2. There was very little direct monitoring of individual child behavior in this classroom, in marked contrast to the teacher in classroom 2 who monitored student performance carefully and frequently. As a result, children in classroom 3 received very little feedback regarding their behavior.

The preceding discussion suggests potential uses of classroom social interaction rate as a method for differentiating different teaching styles and for evaluating classroom environs. Observation systems, such as the one described, could provide teachers with a relatively convenient means of monitoring the effectiveness of their own behavior in meeting their educational objectives. Further, tracking the development of social interaction patterns across time may be helpful in identifying crucial times and conditions for establishing a planned learning environment.

The data gathered regarding peer interaction rate as a function of group size have been presented with caution because of design limitations. However, it may be that the group size variable does not affect peer interaction rate in classroom settings as much as is commonly believed. Alternatively, it may be that group size is an important influence during the time students are introduced to stimulus control, but once attained, the size variable loses much of its influence. Further research would provide useful information for testing and refining these hypotheses.

Associated with the need for investigation of the parameters of social interaction is the need for normative data. As mentioned earlier, many commonly used descriptors of child behavior are norm referenced but rarely is that norm specified. Individual baseline data can indicate change, but the question of whether the behavior changes to within normal limits cannot be answered without group norms established in the natural setting. In addition, research utilizing both individual and classroom interaction rate systems seem well suited to investigating modeling and ripple effect problems.

The classrooms observed in this study probably did not immediately show differentiated levels of social interaction from the first day of school. A good deal of contingency management presumably preceded the learning environs that were observed in mid year. A longitudinal study of social interaction rate could provide detailed information on the effects of such manipulations upon the social behavior of individual students.

There are a number of additional questions which peer interaction rate could be used to investigate. For example, is there a classroom interval or activity during which interaction rates become asymptotic? Are there variations among teaching styles when interaction rate reaches its greatest differentiation? Are teacher behaviors associated with establishing stimulus control similar to or different from those associated with maintaining stimulus control?

Hartup (1970) notes that there is relatively little data available on the parameters of social interaction. The observation model developed in the present study may consitute one method for filling this research vacuum. However, additional studies are required to answer such questions and to establish the utility and generality of peer interaction rate as a measure of teaching style and classroom environs.

References

Beller, E. K. Teacher evaluation: Why, what and how. Peabody Journal of Education, 1971, 48, 25-39.

Crowther, B., Pantleo, P. Measurement of group interaction rate. Psychological Reports, 1970, 27, 707-712.

Fahl, M. A. Emotionally disturbed children: Effects of cooperative and competitive activity on peer interaction. American Journal of Occupational Therapy, 1970, 24, 31-33.

Flanders, N. Analyzing teaching behavior. Reading, Mass.: Addison-Wesley, 1970.

Hartup, W. W. Peer interaction and social organization. In Mussen (Ed.), Carmichael's manual of child psychology, Vol. II. New York: Wiley & Sons, 1970, 361-456.

Hunt, D. & Joyce, B. Teacher trainee personality and initial teaching style. American Educational Research Journal, 1967, 4, 253-259.

Lewin, K., Lippit, R., & White, R. Patterns of aggressive behavior in experimentally created "social climates." Journal of Social Psychology, 1939, 10, 271-299.

Murphy, P. & Brown, M. Conceptual systems and teaching styles. American Educational Research Journal, 1970, 7, 529-540.

Olpin, M. & Kogan, K. L. Child meets child: Social interaction between school-age boys. Perceptual Motor Skills, 1969, 28, 751-754.

Raph, J. B., Thomas, A., Chess, S., & Rorn, S. J. The influence of nursery school on social interactions. American Journal of Orthopsychiatry, 1968, 38, 144-152.

Rosenshine, B. Evaluation of classroom instruction. Review of Educational Research, 1970, 40, 279-300.

Walker, H. M. & Hops, H. The use of group and individual reinforcement contingencies in the modification of social withdrawal. Report No. 6, May, 1972, University of Oregon, Contract No. NPECE-70-005, OEC 0-70-4152 (607), Bureau of Educationally Handicapped, U. S. Office of Education.

Wiesen, A., Hartley, G., Richardson, C., & Poski, A. The retarded child as a reinforcing agent. Journal of Experimental Child Psychology, 1967, 5, 109-113.

Footnotes

1 Teaching style as used here refers to differences in characteristic ways of handling information and of applying sanctions that are consistent and stable over class sessions (after Murphy & Brown, 1970).

Table 1

Classroom Working Conditions Stratified by
Source of Authority and Number of Contributors

Producer	Designated Superior (Teacher)	Contemporary (Peer)	Self
Group	* Group singing recitation	Student led activity Class meetings Class elections Committee work	Leaderless group Spontaneous game formation Casual conversation
Individual	Teacher led activity Aide led activity Question/answer Direct instruction	* Peer tutoring	Independent seatwork Independent reading or other assignments

*In actual practice the indicated categories were not used because for the group product designated superior category the activity is incompatible with interaction and in the case of individual producer-peer source of authority, no formal tutoring relationship were observed.

Table 2

Peer Social Interaction Rate Per Child Per Minute in Different Activities within Three Separate Classrooms

	Classroom 1				Classroom 2				Classroom 3			
	$\bar{x}$	SD	No. of Sessions	$\bar{x}$ Duration	$\bar{x}$	SD	No. of Sessions	$\bar{x}$ Duration	$\bar{x}$	SD	No. of Sessions	$\bar{x}$ Duration
Teacher led	.19	.09	9	19.7'	.16	.06	14	36.6'	.21	.08	17	25.3'
Aide led					.42	.14	11	34.7'	.14	(n=1)	1	24.0'
Student led	.33	.13	4	38.8'					.62	(n=1)	1	
Leaderless	.63	.09	4	18.3'								10.0'
Seatwork	.48	.16	7	13.3'	.320	.175	5	22.2'	.57	.14	11	13.7'
Transition	.73	.18	11	5.5'	1.17	.67	10	2.2'	1.02	.33	17	6.1'
Total*	.50	.10	11	12.7'	.20	.07	14	22.3'	.43	.12	17	15.2'
Total	.50	.11	11	47.2'	.27	.08	14	45.8'	.42	.11	17	35.5'

*Total rate data was based upon three categories for which data were available for all classrooms, teacher led, seatwork, and transition.

Table 3

Analysis of Effect of Classroom Activity
on Peer Social Interaction Rate

	ANOVA			
Source	SS	df	MS	F
Activity Effect	9.7371	2	4.8685	69.35*
Classroom Effect	.2615	2	.1308	1.86
Interaction Effect	1.1784	4	.2946	4.20*
Within Cell	6.5355	93	.0702	

*Significance beyond .05 level.

Figure Captions

Fig. 1 Mean interaction rate (all categories) per child, per minute for classrooms 1, 2, and 3

Fig. 2 Peer social interaction rate as a function of group size during teacher led activity

Fig. 3 Mean peer interaction rate for teacher led, seatwork and transition activities for classrooms 1, 2, and 3

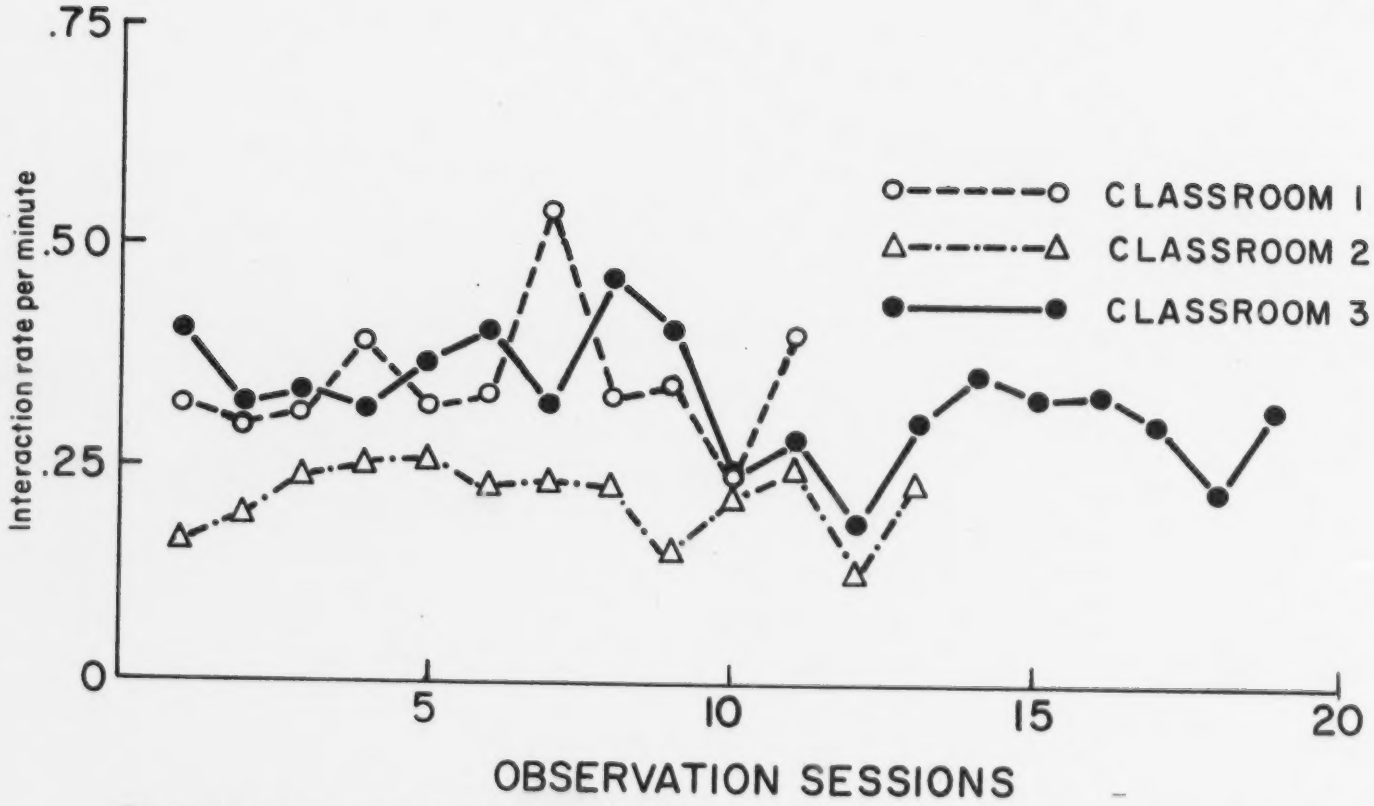

Fig. 1. Mean interaction rate (all categories) per child per minute for classrooms 1, 2 and 3.

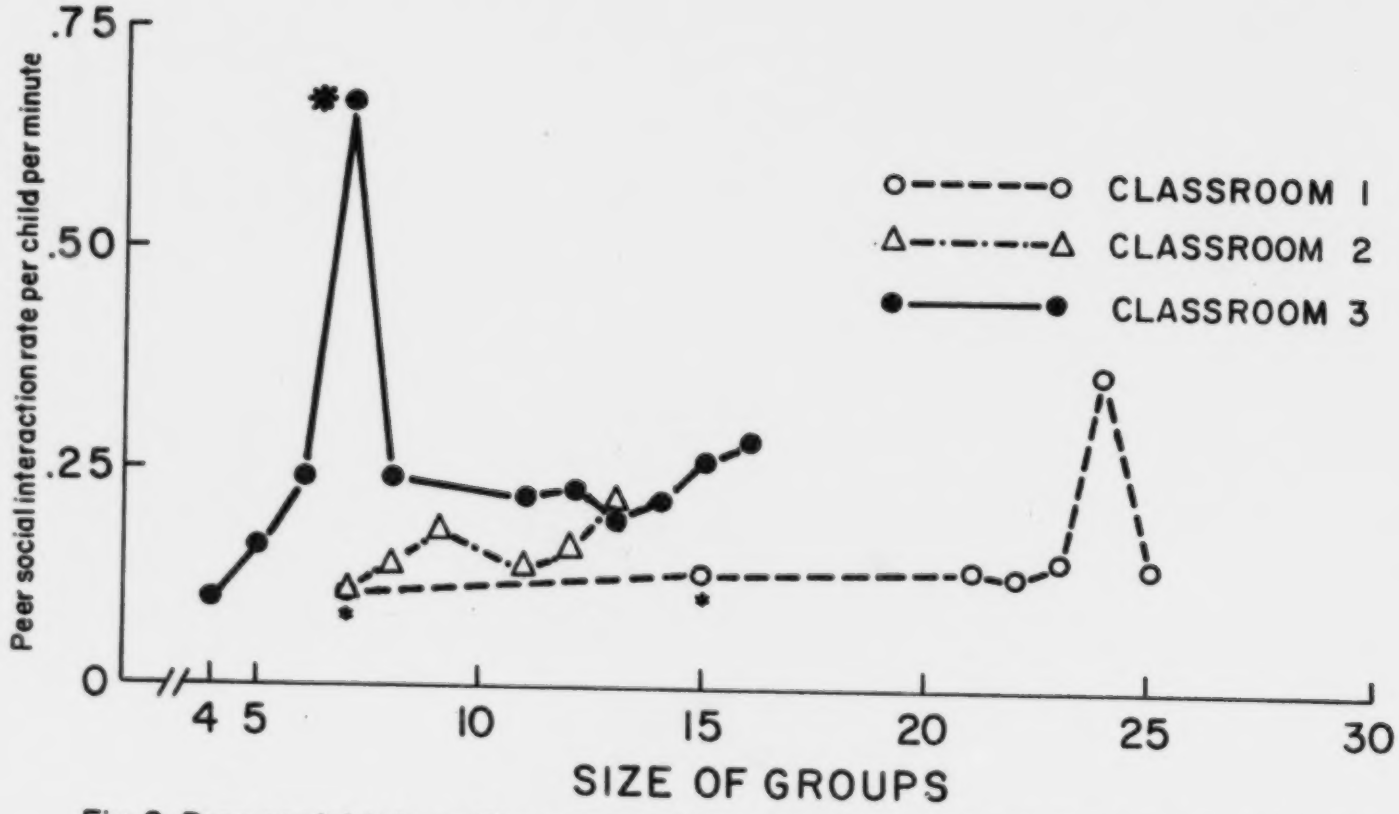

Fig. 2. Peer social interaction rate as a function of group size during teacher-led activity

* Designated points for Classrooms 1 and 3 are based on less than 10 minutes observation

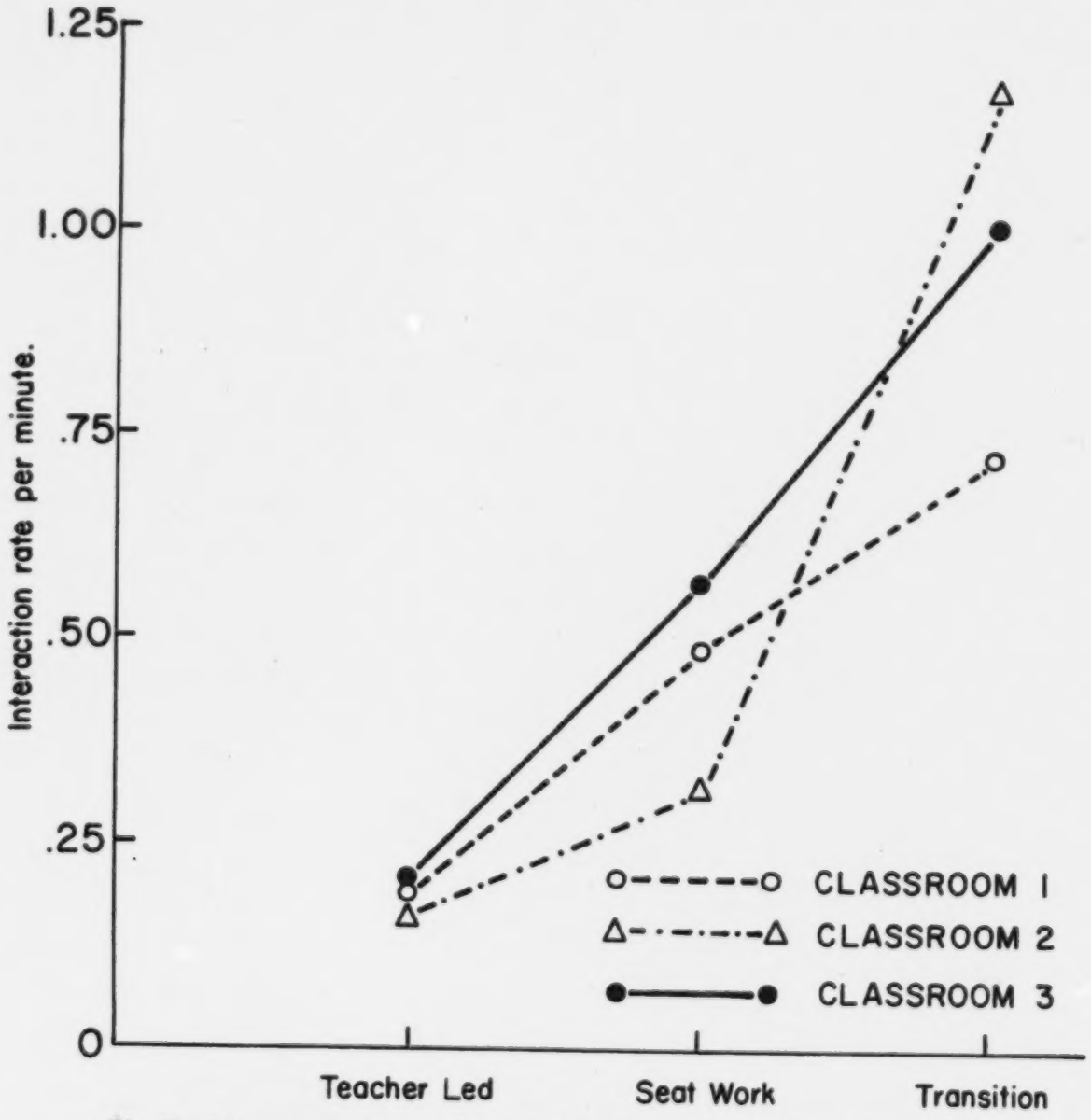

Fig.3. Mean peer interaction rate for teacher led, seat work and transition activities for classrooms 1,2 and 3.